JOURNAL OF ACADEMIC RESEARCH FOR HUMANITIES
ISSN 2663-192x

HJRS Link: Journal of Academic Research for Humanities (HEC-Recognized for 2022-2023)
Edition Link: Journal of Academic Research for Humanities, 3(1) January-March 2023
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Link of the Paper: https://jar.bwo.org

Impact of IT Implementation on Operational Performance: Mediating Role of Supply Chain Integration

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Paper Information

Citation of the paper:
(APA) Sajid. Nimra, Anjum. Sarah and Shoaib. Sara, (2023). Impact of IT implementation on operational performance; the mediating role of supply chain integration. Journal of Academic Research for Humanities, 3(1), 88-99.

Subject Areas:
1 Information Technology
2 Supply Chain and IT

Timeline of the Paper:
Received on: 02-02-2023
Reviews Completed on: 20-02-2023
Accepted on: 23-02-2023
Online on: 24-02-2023

Published by:
BWO RESEARCHES (PVT) LTD PAKISTAN

Abstract

In today's increasingly globalized and competitive economy, supply chain management (SCM) that makes use of information technology (IT) is more crucial than ever. Information technology's ability to deliver up-to-date, correct data has helped boost business efficiency significantly (OP). The purpose of this research is to examine the connection between IT implementation, Supply Chain Integration, and Operational Performance. It provides a conceptual framework model showing how the introduction of IT affects Operational Performance and how Supply Chain Integration mediates the relationship between IT implementation and Operational Performance. A quantitative approach was used to study data. The structural equation modelling method is used to test theories about the relationship between IT implementation, SCI, and operational performance, using data from manufacturing companies in Pakistan. The findings imply that the introduction of IT has no direct impact on Operational Performance, but rather improves Operational Performance by magnificent impact on Supply Chain Integration. As a result of which, businesses should prioritize Supply Chain Integration promotion and use IT as a facilitator. This indicates that in order for businesses to reap the maximum benefits of SCI, they need to leverage different integration strategies and that in some instances, focusing exclusively on selected integration activities can be counterproductive. Another intriguing conclusion is that businesses can incrementally improve their operational performance in the direction of full exploitation of the benefits of Supply Chain Integration. Implementing IT in supply chains would improve key areas of Supply Chain Integration, which will lead to monetary and operational gains.

Keywords: IT implementation, Supply chain integration, Operational performance, Customer Integration, Internal Integration.

Introduction

SCM theory states that supply chain members must cooperate to be competitive. Businesses must work with partners and leverage their capabilities to cut costs and improve quality. Tight cooperation with supply chain partners is best for this. Supply chain stakeholders must share information to communicate and integrate. (W. Yu, 2015). These operations require close coordination among raw material suppliers, manufacturers, distributors, and retailers to match consumer expectations while reducing costs. Supply chain integration is needed to share data and information. Supply chain integration (SCI) involves integrating vendors, consumers, and internal departments to improve supply chain stakeholders' productivity. (W. Yu, 2015).

IT has made it possible and facilitated real-time integration of supply chain partners by providing enterprises with a clear perspective and transparency of potential operations in the future by upgrading and making better the processes of manufacturing plans, inventory stock keeping and scattering and distributing of goods. All of this was possible because of data distribution of logistics, operations, and strategic decisions between decision holders of the supply chain. As a result, practically all organizations in the present day's trade and environment have deployed, or are in the middle of deploying, IT to simplify operational performance. (Li et al., 2009; Zhang et al., 2005). The use of information technology (IT) in the supply chain enables businesses to develop integrated supply chains that make the most of their suppliers' and customers' resources and knowledge to boost the performance of all involved. (W. Yu, 2015).

SCI can be seen as an internal or external competence that focuses on collaboration and coordination among functions and organizations, relying on the theoretical framework that was chosen. The operational and financial performance of a corporation is generally influenced by both internal and external SCI. Stringent internal and external SCI in the manufacturing industry has been shown to increase service responsiveness and produce significant cost savings. (Yuen & Thai, 2016).

With the introduction of information technology (IT), the path to increasing the efficacy and efficiency of company operations throughout the supply chain has been paved. (Ganbold et al., 2021). The rapid development of IT has changed the conditions of global business operations. IT's ability It's for fast, correct & exact, and trustworthy data has resulted in a boost in the execution of operations of both the principal organization and its supply chain stakeholders. (Jin, 2006; Li et al., 2009). Supply chain integration has been greatly aided by the evolution of information technology in the forms of radio frequency identification devices (RFID), the Internet of Things (IoT), big data analytics, the Cloud, and block changes, to name a few. (Ganbold et al., 2021) . Technology-enabled information systems try to combine numerous corporate processes for rapid, reliable, and online network connectivity. (Bayraktar et al., 2009). IT can promote cross-functional teamwork and coordination among supply chain participants by exchanging details on manufacturing planning and control, which govern supply chain operations.(W. Yu, 20 15). These technologies have resulted in the improvement of the operational performances of firms through supply chain integration.

The objective of the study

- To research how an organization's operational performance is impacted by IT implementation.
- To study the mediating role of supply chain integration between IT implementation and Operational performance.

Research question:

- What is the effect of IT implementation on the Operational performance of a firm?
- How supply chain integration mediates the relationship between IT implementation and Operational performance?

The purpose of this study is to broaden our comprehension of the effects of IT implementation on SCI and OP. To empirically examine the direct and indirect effects of IT implementation on OP, as well as the effect of IT implementation on OP through SCI, we formulate a set of hypotheses based on the existing research.

Literature Review

Theoretical Background

Supply Chain Integration (SCI)

Supply chain management's most studied topic is supply chain integration (SCI) (Lu et al., 2018). A company's ability to connect exchange-related operations inside functional units and with supply chain partners is SCI (Li et al., 2009). SCI measures how much a manufacturer engages with supply chain partners to create strategic direction and govern internal and external business operations. SCI is crucial to a company's productivity. In a fast-changing corporate environment, supply chains need digital technology to properly manage data, materials, and finances (W. Yu, 2015). All researchers agree that SCI is important for creator success (Huo, 2012; Prajogo & Olhager, 2012). Most academics believe SCI boosts supply chain competitiveness and long-term growth (Lu et al., 2018). SCI is sometimes referred to as producer-supplier consolidation (Huang et al., 2014). According to the leftmost ones, Supply Chain Integration has three categories: supplier, internal, and customer. We choses supplier, internal, and customer integration definition regardless of its merits. Customer-supplier integration is external integration (Amoako-Gyampah, 2020)

Internal integration (II):

Internal integration pertains to how tightly a focus organization's internal processes are integrated with other areas inside the business such as marketing, finance, engineering, and so on. (Amoako-Gyampah et al., 2020). Internal integration shows that several actions and work inside a company should not operate in operational silos, but rather as unified icons and operations. (Zhao et al., 2011). The term "internal integration" describes how well an organization can organize its organizational strategies, practices, procedures, and behaviours or into behaviour, manageable operations to meet the needs of its clients. (Yuen & Thai, 2016)

Supplier integration (SI)

Supplier integration (SI) is the degree to which businesses communicate data and integrate their activities, procedures, technology, and other services with those of their suppliers in order to motive choices. (Amoako-Gyampah et al., 2020). Supplier involvement helps to lower teamwork pressure because certain actions are assigned to those with the competencies and knowledge to complete them more rapidly. Supplier integration improves the quality of the product. Effective supplier management can minimize deviations in received components and products while also ensuring that suppliers meet quality requirements and standards, which decreases process variability and can improve delivery and product reliability. Supplier integration allows suppliers to acquire knowledge more about a company's activities. A supplier can boost the firm's efficiency in the process by establishing a thorough understanding of its operations (He et al., 2014).

Customer integration (CI)

To better serve their customers, businesses are increasingly integrating with those customers close to them. The focal company in a supply chain is an organization like a

factory that relies on both its upstream suppliers and its downstream consumers (Amoako-Gyampah et al., 2020). As a result of a deeper understanding of market expectations and prospects made possible by customer integration, businesses are better able to respond to customers' wants and needs promptly by balancing supply and demand (Wong et al., 2011). Customer integration entails identifying customer needs and customizing internal processes to satisfy those needs so that producers can proficiently fix product issues (He et al., 2014).

IT Implementation (ITI)

By highlighting relationship-specific assets, encouraging data and knowledge sharing, and building protracted cooperative partnerships, IT can help businesses secure durable competitive advantages in supply chains by leveraging scarce, imitable, and non-substitutable resources.

- IT has been found to Infect supply chain performance via lean/just-in-time (JIT) methods, process management, supply chain coordination, supply chain cooperation, and supply chain integration.
- Real-time data capture and sharing has become critical for improving supply chain performance. Timely information sharing aids decision-making and frequently emerge in the form of little to low lead times and small batch sizes (Devaraj et al., 2007).

Competitive advantage

Organizations can gain a competitive advantage by effectively utilizing supply chain management (SCM) by gathering key info along the entire supply chain and responding quickly to any predictable changes in the market. By assisting structured, well-planned and automatic information communication, IT can indirectly enhance corporate performance by improving SCI (Y. Yu et al., 2021).

Goals

The goals of IT are to provide accessibility and visibility, to enable a single source for data, to allow decisions on the basis of overall supply chain data, and to enable collaboration with partners. (Group & Varma, n.d.).

Operational Performance (OP)

Operational performance (OP) is a fundamental promoter and catalyst of entire supply chain efficiency, which typically is the sum of various ingredients and catalysts in the system. A supply chain's performance metrics should include operational indicators such as user satisfaction, operational responsiveness to shifting market demand, cost, quality, flexibility, and lead time. OP is used as a construct for two reasons.

- OP is a key catalyst of supply chain accomplishment and performance.
- OP is a calculable construct that may be affected by the extent and degree of SCI (Lu et al., 2018).

The operational effects of IT are rarely examined in the literature on information systems. As a result, operational performance has been used as a dependent variable in this study's conceptual model (Ye & Wang, 2013).

Theoretical Connectivity

ITI and SCI

IT can promote supply chain integration and coordination by sharing demand projections and manufacturing plans, providing real-time, trustworthy information, and reducing teamwork and cooperation expenses (Li et al., 2009).

Online commercial community supply chains are changing. The Big Three American Automakers are launching the Automotive Network Exchange (ANX) to investigate internet business communities. ANX will standardize automobile order information communication. Supply chain management uses communication and teamwork to maximize the short- and long-term success of each link. SCM discourse and IT use are important. Inconsistent ordering causes it.

More EDI data must be sent between parties to increase supply chain efficiency. Businesses must rethink their organizational and technical procedures, update their product distribution networks and customer care routines, and retrain their employees to deploy an IT-enabled supply chain.

Challenges

When discussing challenges to create an IT-integrated SCM, the following are frequently stated by scholars and practitioners: problems with IT-business model integration, IT-strategic planning, IT-infrastructure decay, IT-application gaps in the virtual company, and IT-implementation expertise in the supply chain management all contribute to this (Gunasekaran & Ngai, 2004).

SCI and OP

It has been proposed by expanding empirical proofs that high prospective perks and benefits of performance are linked with high level of integration (Devaraj et al., 2007). Studies have been conducted on the association of SCI and OP. SCI pattern success depends on operational effectiveness in different arrangements and layouts. (Cao et al., 2015). The observations of the literature on the topic of customer integration appeared to be substantially accordant and consistent. Customer integration is an important enabler for achieving customer satisfaction, but some researchers believe it does not facilitate operational performance (Lu et al., 2018). There were several assumptions put up regarding the link between customer integration and operational performance; nevertheless, some evidence suggests there is a direct and positive correlation between the two.

Discrepancies in the literature on internal integration are fairly evident. According to certain authors, no first-hand and direct relationship exist between internal integration and the manufacturer's operational performance (Koufteros et al., 2005). On the other hand, some researchers found a positive relationship between internal integration and the operational performance of firms. Reduced inventory accelerated production cycles, and increased flexibility can all be achieved with accurate, sufficient, and fast supply chain information. Consequently, SI and CI aid in enhancing OP (Shou et al., 2018).

A few members of the SC might be resistant to change and hence prevent the implementation of promising new approaches to innovation. Several current company examples highlight the relevance of the interconnections between Supplier Integration, performance, and innovation strategies.

Strategies for supplier integration

When *Sony and Ericsson* merged in 2001, it was a game-changer for both companies. However, *Ericsson*'s failure to adopt a suitable product innovation strategy in the smartphone category led to the end of their cooperation in 2010. *IBM and Apple* combined their strengths in 2014 so that the iPad and iPhone could take advantage of *IBM*'s expertise in managing big data, thereby increasing the companies' market competitiveness and productivity. Further, both *Google and Luxottica* were motivated by a desire to innovate their products (Duhaylongsod & De Giovanni, 2019). Supplier integration can't get off the ground without regular communication between suppliers. Supply chain as a whole purchasing agents benefits from information sharing because it increases performance in flexibility and delivery in the means thereafter.

- Real-time communication between customers and suppliers helps improve the quality of service by providing stock levels, production schedules, and feedback.
- Buyers and sellers share relevant data to reduce delays and ensure timely deliveries.

Technology facilitates communication and exchange of information, allowing shoppers to plan and coordinate supply and demand.

ITI and OP (Liu et al., 2021)

The influence of information technology (IT) on operational performance is a major concern, with the most innovative companies being able to make and distribute their products twice as early as the least innovative companies (Jin, 2006). IT implementation will help an organization follow the practices of JIT and TQM to achieve lean manufacturing and better, enhanced, and effective operational performance.

Taking the model of (Shukor et al., 2021) into consideration, this study argues that IT implementations impacts supply chain integration which stimulates, in turn operational performance and the direct impact of IT implementation on operational performance is also studied.

This conceptual framework emphasizes the importance of IT in facilitating supply chain integration, which has a direct bearing on operational efficiency. The following subsections offer a thorough explanation of the steps taken in the deductive quantitative approach.

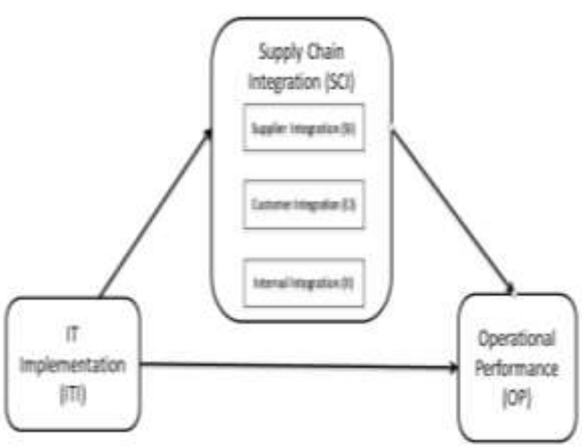

Figure 1 Conceptual Framework

Methodology

Data Collection

Purposive sampling was used to collect data from the Pakistani manufacturing sector and the quantitative approach was used to analyze the results. Data was gathered through a variety of means, including email, online survey platforms, social media, and traditional distribution techniques. Google Forms, a web-based and online survey tool, was used to reach the target audience. The target demographic received printouts of the same questionnaires both personally and through professional networking venues.

Participants had to meet a minimum level of junior management hierarchical level and were selected from a database containing information on different manufacturing industries. Participation was optional and no monetary compensation was offered.

Measures

The development of a questionnaire serves as an evaluation tool for the model's components. To determine whether or not the questionnaire is valid, resources are used, and employees of a Pakistani company are given copies to fill out. A structured assessment questionnaire is used to evaluate hypotheses, and SMART-PLS 4.0 is used to analyze the sample. The sample consisted of a total of Sixty-One participants.

Data Analysis

Male and female representation in the 61 usable samples was 65.6% and 34.4%, respectively, with 36.1% of respondents working in procurement and purchasing, 13.1% in operations and logistics, 11.5% in Business Development and Sales, 9.8% in General Management, 6.6% in Marketing, accounting and Finance, 4.9% in Human resource and Research, analysis and strategy, 3.3% in ICT, 1.6% Audit risk and compliance and PR, Media and Communication, respectively.

Table 2

Descriptive statistics (N = 61)

	Demographics	Frequency	Per cent
Gender	Male	40	65.6
	Female	21	34.4
Current Position	Top Management	4	6.6
	Senior Management	15	24.6
	Middle Management	19	31.1
	Junior Management	23	37.7
Work Experience	Less than 1 year	30	49.2
	1 – 3 years	16	26.2
	4 – 7 years	5	8.2
	8–10 years	3	4.9
	More Than 10 years	7	11.5
Department	Procurement and purchasing	22	36.1
	General Management	6	9.8
	Business Development & sales	7	11.5
	Marketing	4	6.6
	Research, Analysis and Strategy	3	4.9
	Operations and Logistics	8	13.1
	Audit Risk and Compliance	1	1.6
	Human resource	3	4.9
	ICT	2	3.3
	PR, Media and Communication	1	1.6
	Accounting and Finance	4	6.6
Average no. of Projects	1 – 4	38	62.3
	4 – 7	9	14.8
	7 – 10	8	13.1
	Above 10	6	9.8

The model has been evaluated using a structural equation modelling (SEM) approach with Smart PLS 4.0. PLS is a component-based approach that relies on three primary types of interactions: outer/measurement, inner/structural, and weight relationships (Henseler & Fassott, 2010). A good model fit is indicated by a sizeable path coefficient, R-squared values that are within acceptable ranges, and internal consistency/construct reliability values of 0.70 or above. All the constructs' convergent validity analysis summaries were displayed in Table 3. Cronbach's alpha is sufficient for currently used scales, while a value of 0.60 was deemed adequate for freshly created scales. Composite reliability is often less cautious than the average variance extracted (AVE). The correlation between latent variable scores and their corresponding rows and columns must be smaller than the square root of AVE to prove sufficient discriminant validity. Figure 2 displays the modelled measurement results.

Table 3 Reliability Testing

			Composite Reliability	Average Variance Extracted (AVE)
CI	CI1	0.921	0.963	0.839
	CI2	0.923		
	CI3	0.908		
	CI4	0.912		
	CI5	0.916		
II	II1	0.870	0.945	0.775
	II2	0.874		
	II3	0.888		
	II4	0.918		
	II5	0.850		
ITI	ITI1	0.944	0.952	0.868
	ITI2	0.937		
	ITI3	0.914		
OP	OP1	0.874	0.952	0.798
	OP2	0.917		
	OP3	0.873		
	OP4	0.921		
	OP5	0.881		
SI	SI1	0.880	0.958	0.822
	SI2	0.905		
	SI3	0.922		
	SI4	0.915		
	SI5	0.912		

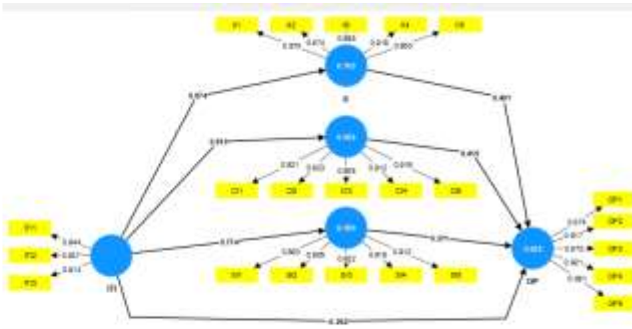

Figure 2. Algorithm

Discriminant validity is a method of gauging how significantly two constructs differ from one another, using the Fornell and Larcker Criterion, Heterotrait-Monotrait Ratio, and Item Crossing Loadings. The square root of AVE should be the highest of any inter-construct correlation, and the correlation matrix in Table 4.1 complies with the norm.

Table 4.1 Correlations of Discriminate Validity

	CI	II	ITI	OP	SI
CI	0.916				
II	0.781	0.880			
ITI	0.810	0.874	0.932		
OP	0.859	0.809	0.722	0.893	
SI	0.905	0.820	0.774	0.880	0.907

To ensure the data is discriminated against, one might apply a statistical method called item cross-loading analysis. Each item's cross-loading within its own construct should be higher than that of any other item (Hair et al., 2011; Hair Jr et al., 2014). The recommended minimum for the difference between the item's cross-loading on its target builds and the loadings on all other constructions is 0.1. Table 4.2 displays the inter-correlations between all the variables.

Table 4.2 Cross loadings of all variables.

	CI	II	ITI	OP	SI
CI1	**0.921**	0.778	0.718	0.868	0.898
CI2	**0.923**	0.693	0.771	0.764	0.829
CI3	**0.908**	0.698	0.712	0.776	0.788
CI4	**0.912**	0.705	0.758	0.772	0.808
CI5	**0.916**	0.699	0.751	0.752	0.821
II1	0.777	**0.870**	0.738	0.859	0.826
II2	0.627	**0.874**	0.713	0.702	0.636
II3	0.643	**0.888**	0.788	0.652	0.641
II4	0.687	**0.918**	0.842	0.696	0.755
II5	0.694	**0.850**	0.766	0.635	0.739
ITI1	0.778	0.851	**0.944**	0.701	0.745
ITI2	0.766	0.835	**0.937**	0.695	0.746
ITI3	0.719	0.755	**0.914**	0.617	0.670
OP1	0.733	0.671	0.584	**0.874**	0.758
OP2	0.823	0.696	0.660	**0.917**	0.823
OP3	0.691	0.670	0.540	**0.873**	0.733
OP4	0.784	0.703	0.650	**0.921**	0.803
OP5	0.799	0.860	0.773	**0.881**	0.809
SI1	0.742	0.686	0.619	0.763	**0.880**
SI2	0.822	0.763	0.723	0.823	**0.905**
SI3	0.861	0.760	0.710	0.786	**0.922**
SI4	0.814	0.800	0.686	0.840	**0.915**
SI5	0.861	0.707	0.764	0.775	**0.912**

Analyses for internal model measurement follow those for external model measurement. Hypothesis testing is another common application of the SMART PLS program. Bootstrapping is a statistical method for evaluating hypotheses in Partial Least Square (PLS), as described by Haenlein and Kaplan (2004). It uses a resampling method, which entails selecting a sizable subsample (often 5000) from the full dataset. The results of bootstrapping are displayed in Fig. 3.

Table 5 Factor Loading Significant

		Loadings	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
CI	CI1	0.921	0.020	47.148	0.000
	CI2	0.923	0.016	57.279	0.000
	CI3	0.908	0.029	31.051	0.000
	CI4	0.912	0.023	39.680	0.000
	CI5	0.916	0.032	28.196	0.000
II	II1	0.870	0.033	26.151	0.000
	II2	0.874	0.028	30.799	0.000
	II3	0.888	0.029	31.145	0.000
	II4	0.918	0.018	52.211	0.000
	II5	0.850	0.042	20.359	0.000
ITI	ITI1	0.944	0.012	77.337	0.000
	ITI2	0.937	0.017	54.177	0.000
	ITI3	0.914	0.023	40.504	0.000
OP	OP1	0.874	0.040	22.096	0.000
	OP2	0.917	0.027	33.925	0.000
	OP3	0.873	0.032	27.196	0.000
	OP4	0.921	0.018	51.514	0.000
	OP5	0.881	0.039	22.815	0.000
	SI1	0.880	0.029	30.394	0.000

		Loadings	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
S	SI2	0.905	0.020	44.246	0.000
I	SI3	0.922	0.019	49.707	0.000
	SI4	0.915	0.020	46.325	0.000
	SI5	0.912	0.024	38.769	0.000

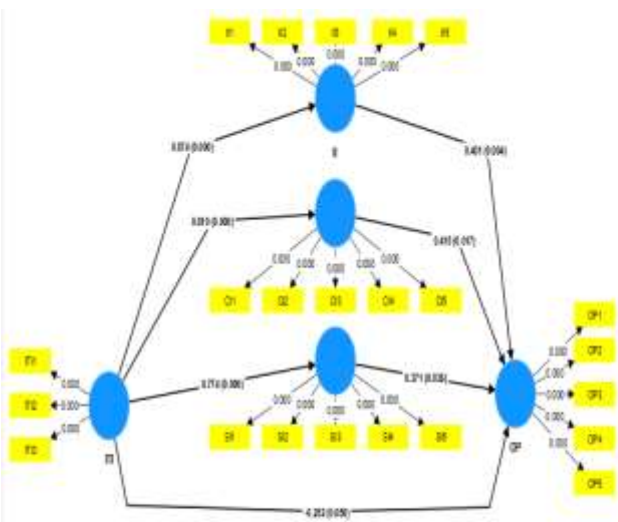

Figure 3 Bootstrapping

The quality of an internal model is measured by the coefficient of determination (R2) and cross-validated redundancy (Q2). R2 measures the extent to which one exogenous variable affects another endogenous variable, while Q2 measures the model's precision. Table 5.1's Q2 values, all of which are greater than zero, verify that the model is well-fit.

Table 5.1 *Predictive power of construct*

Constructs	R-square	Q-square
CI	0.656	0.639
II	0.765	0.758
OP	0.825	0.500
SI	0.599	0.579

The Structural Equation Modeling (SEM) method was utilized to examine five hypotheses posed in this investigation. Table 5.2 displays the results of the hypothesis tests, including the hypothesis loadings, probabilities, standard deviations, and T-statistics.

Table 5.2 Hypothesis Testing

No	Hypothesis	Loadings	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Results
H1	ITI -> CI	0.810	0.084	9.683	0.000	ACCEPTED
H2	ITI -> SI	0.774	0.094	8.278	0.000	ACCEPTED
H3	ITI -> II	0.874	0.036	23.971	0.000	ACCEPTED
H4	II -> OP	0.401	0.152	2.628	0.004	ACCEPTED
H5	SI -> OP	0.371	0.206	1.797	0.036	ACCEPTED
H6	CI -> OP	0.415	0.195	2.131	0.017	ACCEPTED
H7	ITI -> OP	-0.252	0.153	1.641	0.050	REJECTED

As structural equation model is adequate, the predictions can be tested on it. Positive and statistically significant relationships were found between SI and OP (b = 0.37, t = 1.797, p0.036), CI and OP (b = 0.415, t = 2.131, p0.017), and II and OP (b = 0.401, t = 2.628, p0.004), and between CI and IT implementation (b = 0.810, t = 9.683, p0.00), SI and IT implementation (b = 0.774, t = 8.278, p0.00) and II and IT implementation (b = 0.874, t = 23.971, p0.00). Therefore, all HI, H2, H3, H4, H5 and H6 can be accepted as true. No statistically significant relationship between IT adoption and OP was discovered in our study (b = -0.252, t = 1.641, po 0.050). These results show that IT implementation is inversely related to Operational performance.

Discussion

The study's primary objective was to suggest and test a model of the relationship between IT deployment, SCI, and operational effectiveness. Some very important facts have emerged. The study's main contribution is to validate existing theories about the effect of IT deployment on SCI performance. This study examines the links between SCI, IT deployment, and operational efficiency, suggesting SCI acts as a link between IT and OP. With the use of this model, the connection between SCI and OP may be

better understood; lending credence to the widespread belief that SCI has a beneficial effect on OP. Also, this research addresses the following two concerns:

Do direct effects of IT implementation on OP exist? (1) H1 suggests that OP will not benefit from the introduction of IT. However, the response to the second question could shed light on this: Consideration of (2) The Impact of IT implementation on OP SCI, as predicted by H2 and H3, moderates the connection between IT deployment and operations. According to the findings, both SCI and OP benefit from IT's implementation and SCI. This is consistent with some research that has found that tighter coordination between a company and its suppliers improves operational performance. Results showed that SCI is distinct from the use of information technology. Instead, enhancing SCI through the incorporation of IT is a distinct construct. Integration in the supply chain occurs as a result of interactions between people, which technology can facilitate. Managers should keep this in mind as they weigh the benefits of potential IT projects. This research suggests that funds be allocated primarily to IT projects that boost SCI. It is the enhancement of SCI, and not the IT expenditure itself, that will provide any competitive advantage from IT. The third new insight from this research is a method for evaluating the success of IT projects. Most past studies evaluated IT by counting how much money was spent on IT and how much time was spent in IT buildings, both of which ignore the impact that supply chain partners have on IT by not considering how they adapt, adopt, and use IT. The positive effects of IT deployment at individual organizations are sometimes thwarted by a lack of IT alignment between supply chain participants. The purpose of this research was to develop a more complete framework for capturing the dynamics of IT implementation and their impact on supply chain management (SCM) by combining the concepts of IT usage and IT alignment.

Conclusion

With the quickening pace of scientific and technological advancement, IT's capabilities have expanded considerably. More and more OP professionals are investing in IT because of evidence suggesting its potential to enhance OP. As more people become aware of the advantages of implementing IT, so too does it become crucial to comprehend the effects it has on OP. IT has been seen as a catalyst for integration, the cornerstone of supply chain management, in previous research. The supply chain industry has been notably affected by the introduction of IT. Because of its ability to furnish relevant and timely data, IT is assumed to perpetually enhance SCI and OP. As a result of these discoveries, our knowledge of how IT deployment affects OP has been expanded. These results also show how crucial it is for managers to support SCI and use technology to facilitate it.

Managerial Implications

The results of this study offer insights into how to create strategies for IT deployment and SCI that will improve OP.

The findings show that SCI is influenced by IT implementation, and that SCI mediates the connection between IT deployment and OP. There are several directions that managerial practices could go from this discovery. For one, it highlights how crucial it is for supply chain firms to successfully deploy IT. The results of this study suggest that attempts to advance SCI through IT should be given greater emphasis.

Second, the importance of SCI is confirmed by the not-so-novel observation that OP may be improved by integrating the supply chain partners.

Given the magnitude of SCI's effect on OP, it's prudent for businesses to prioritize initiatives that strengthen communication, coordination, and cooperation among all

supply chain participants. It is recommended that businesses explore using ITs that have been proven to encourage SCI, as this is a win-win situation for both parties. Third, this discovery hints at the requirement of competition rather than the actual source of competitiveness that IT is.

Measuring IT with an eye on adoption, implementation, and IT alignment among supply chain partners is another original contribution of this research. This implies that managers should not treat all investments as if they were created equal. The same effort may not yield the same result. The effective execution of SCI projects in the supply chain's complex environment is less of a technological difficulty and more of a management problem, necessitating an in-depth analysis of the business conditions for all organizations involved.

Recommendations

There are a variety of IT classifications that have been proposed by prior research. The fact remains that different types of supply networks benefit from information technology in different ways. Since using IT can be expensive, it may be vital for future research to analyze how various ITs affect various SCI and SCP. So that managers may more quickly determine which type of IT installation will work best for their specific supply chains, a model that correlates ITs with supply chain features is required.

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